UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/009,534	12/14/2001	Atsushi Funabiki	Q67681	4025

7590 09/17/2004

Sughrue Mion Zinn Macpeak & Seas
2100 Pennsylvania Avenue N W
Washington, DC 20037

EXAMINER	
CHANEY, CAROL DIANE	
ART UNIT	PAPER NUMBER
1745	

DATE MAILED: 09/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/009,534	FUNABIKI ET AL.	
	Examiner	Art Unit	
	Carol Chaney	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 June 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-10 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicants' amendment "wherein said Li is not the element intercalated by the electrochemical discharge reaction in the electrolyte" is not described in the specification as originally filed. Since applicants inventive cathode is intended to be used in lithium secondary batteries, it would appear that the element lithium is intercalated into the cathode material during operation of the battery.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Applicants' specification discloses "amorphous β-FeOOH". "Amorphous" is defined as "having no real or apparent crystalline form", (See Merriam-Webster Online Dictionary http://www.m-w.com/cgi-

bin/dictionary?book=Dictionary&va=amorphous&x=13&y=13). β-FeOOH describes a crystal structure. (See Shreir et al., *Corrosion*, Butterworth, Heinemann, 2000, Table 21.8.) A material which simultaneously has no real or apparent crystalline form and an orthorhombic crystal structure is indefinite.

Claim Rejections - 35 USC § 102/103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 2, 9, and 10 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Amin, JP 10-233215 A.

Amin discloses positive active material for lithium batteries having the formula β-$Fe_{1-x}Me_xOOHCl_z$ where $0 \leq x \leq 1$, $0 \leq z \leq 1$, and Me can be any of Ni, Co, Zn, C, Al, Mg, Ca, or B. The material is formed by hydrolysis of a material whose base material is iron chloride or iron. (See abstract.) For the case where z=0, the material is β-FeOOH containing an additional element, as recited in applicants' claim 1. The material disclosed by Amin is formed by hydrolysis of $FeCl_3$ as a base material at a temperature of 70°C. (See Amin, paragraph 11.) With regards to claim 9, the active material disclosed by Amin is used as the positive material of a lithium secondary battery. (See abstract and title.)

Amin does not recite half-widths of x-ray diffraction peaks of the disclosed β-$Fe_{1-x}Me_xOOH$. However, both Amin and the applicant form materials by essentially identical methods. Both Amin and applicants form inventive materials by hydrolysis of $FeCl_3$ as a base material at similar temperatures. Therefore, absent a showing to the contrary, the materials formed should be essentially identical and therefore inherently have similar physical properties, including x-ray diffraction peak half widths. Alternatively, applicants' invention would have been obvious to one of ordinary skill in the art based upon the disclosure of Amin.

Claims 4-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Amin in view of Maegawa et al., US Patent 6,383,235 B1.

As discussed above, Amine et al. disclose applicants' invention essentially as claimed, with the exception that Amine et al. do not specifically disclose particle sizes or aspect ratios of $Fe_{1-x}Me_xOOHCl_z$ cathode materials. Maegawa et al. disclose lithium transition metal oxides as cathode materials for secondary lithium batteries. Iron is specifically mentioned as a metal. (See column 17, lines 5-6.) Thus, Maegawa et al. disclose cathode materials which are essentially analogous to the lithium iron oxy-hydroxide cathode materials disclosed by Amin. Maegawa et al. teach particle size between 0.5 to 5.0 microns are suitable for cathode materials. (Note Maegawa et al., column 6, lines 52-54.) Maegawa teach spherical cathode materials can be densely packed and this is desirable in raising the capacity per unit volume of the battery. (See column 7, lines 10-14.) Therefore, it would have been obvious to one of ordinary skill in

the art to size the β-FeOOH disclosed by Amine et al. as spherical particles with sizes between 0.5 to 5.0 microns because Maegawa et al. teach such a size is suitable for lithium ion secondary batteries with lithium transition metal oxide type cathode materials and the spherical shape will improve packing and energy density in the battery.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carol Chaney whose telephone number is (571) 272-1284. The examiner can normally be reached on Mon - Fri 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Carol Chaney
Primary Examiner
Art Unit 1745

17 August 2004